

1. A method of controlling residual stress in conjunction with a direct metal
2 deposition (DMD) process, comprising the steps of:
providing a substrate;
4 depositing a material onto the substrate in a deposition zone using a DMD process;
and
6 directing the beam of one or more lasers into the zone following the deposition of the
material as a means of controlling residual stress.

2. The method of claim 1, wherein the laser used to deposit the material is also
2 used to control the residual stress.

3. The method of claim 1, wherein a plurality of lasers are used to control the
2 cooling rate of the deposited material.

4. The method of claim 1, wherein the location or intensity of the laser used to
2 control the stress is varied to adjust the location and/or magnitude of the residual stress.

5. The method of claim 4, wherein the intensity of the laser is controlled through
2 defocusing of the beam.

6. In a direct-metal deposition (DMD) process wherein a laser beam is used to melt a powder feed to deposit a material on a substrate, a method of controlling the build-up of residual stress, comprising the steps of:

4 depositing a layer of the material onto a previously deposited layer by moving the laser beam and powder feed along a prescribed deposition path; and

6 following the deposition path with a laser beam incapable of remelting the material as a means of controlling the build-up of residual stress.

7. The method of claim 6, wherein the laser used to deposit the material is also used to control the residual stress.

8. The method of claim 6, wherein a plurality of lasers are used to control the cooling rate of the deposited material.

9. The method of claim 6, wherein the location or intensity of the laser used to control the stress is varied to adjust the location and/or magnitude of the residual stress.

10. The method of claim 9, wherein the intensity of the laser is controlled through defocusing of the beam.